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tainly be expected, and an unusually full gathering of American botanists. Hundreds of industrial and other societies are arranging for memorable occasions, and if some of this enthusiasm could be turned in the direction of pure science the result could not fail to be beneficial.

ANOTHER matter not quite as distant may be suggested here. In connection with the papers upon physiological subjects at the Washington gathering, why not exhibit a collection of physiological apparatus? If each laboratory would send a few pieces the display would be made very interesting.

CURRENT LITERATURE.

Practical Botany¹.

The first edition of the Strasburger's *Kleine Botanische Practicum* published in 1886 has been one of the most useful of the handbooks of recent years. It had its defects, some of which were pointed out in this journal (vol. xii. 91) but they were not such as to seriously impair its usefulness. In this revised edition the author has much improved the book. Considerable additional matter has been inserted, notably in chapters xi, xxii, xxiii, xxvii, xxviii and xxx, and chapters ix and xxi have been almost entirely rewritten. Altogether 52 pages have been added and there are about 20 new figures. It is extremely difficult to make such extensive changes fit in with the old stereotyped plates. This has been done however with a minimum of injury to the appearance of the book, only a few pages being unduly leaded. One could have wished however that so many of the page numbers had not been carried to the inner edge of the page, and that when change was being made these might have been transferred where necessary so as to stand in their proper place.

The figures of the present edition are much better printed than in the first. They now compare favorably with those of the German edition. In every way the book is well manufactured. The suitable paper and loose binding are especially commendable in such a laboratory guide. We hope that it may by reason of these betterments meet with a still wider sale in this country.

¹ STRASBURGER, EDWARD, — Handbook of practical botany, for the botanical laboratory and private student. Edited from the German by W. HILLHOUSE; revised by the author, and with many additional notes by author and editor. Second edition, revised and enlarged. 80 pp. xxiv. 425 (+ 52) figs. 149. New York: Macmillan & Co. [London: Swan Sonnenschein & Co.] 1889.

The new Gray's Manual.¹

The revised (6th) edition of the Manual has been fully noticed in this journal (xv, p. 71). No one who has had any experience in book-making was surprised that there should occur a considerable number of errors and omissions in the first issue of this edition and some of the reviews of the book would have been less absurd had their writers taken some account of human fallibility. In this second issue an attempt is made to give "all such needed emendations of every kind as have come to our [the authors'] notice. Whenever it could be conveniently done these alterations have been made in the plates." The remainder are printed on four pages following p. 735 (designated 735 a, etc.) The corrections in the plates are numerous—over 100 of one sort and another. Seventeen species appear among the "supplementary additions and corrections"—and two genera, *Franseria* and *Paulownia*.

The pocket edition of the Manual is a gem in its way and certainly "fills a long-felt want." It weighs only 14 ounces and is about $\frac{3}{8}$ of an inch thick—just the thing for carrying easily. It is bound in delightfully soft flexible leather, and looks as though it would be durable. We can suggest only one improvement short of India paper and silk-sewing—that is, slightly rounded corners, so as not to catch on the pocket. No botanist who has a copy of the library edition will ever carry that with him after he has seen this. The American Book Company has merited our gratitude for dressing this volume so serviceably and at the same time so handsomely. The *very low* price (\$2) will certainly make this as popular as it is handsome.

Introduction to the Study of Botany.²

He who gets an introduction to the science of botany through the medium of this book will probably have little inclination to cultivate the acquaintance. If this book is a fair indication, Mr. Edward Aveling, D. Sc. (God save the mark!) has need himself to be introduced to the fair science whose most difficult task he has essayed without adequate knowledge.

¹GRAY, ASA.—Manual of the botany of the northern United States. Sixth edition, revised and extended westward to the 100th meridian by Sereno Watson and John M. Coulter. 8° cloth. pp. 760 (+ 4). plates xxv. New York: American Book Co. 1891. \$1.60.

The same, pocket edition, $4\frac{3}{4} \times 7\frac{1}{2}$ inches, full leather, flexible. \$2.

²AVELING, EDWARD.—An introduction to the study of botany. 12° pp. iv. 363. figs. 271. London: Swan Sonnenschein & Co. (N. Y.: Macmillan & Co.), 1891.

The book takes as its "basis the syllabus of subject xv, botany, from the Science and Art Department" of South Kensington, and proceeds to expound the science from this "examinational" standpoint. It is perhaps a fair inference that this "basis" is somewhat narrow, for we read early: "Broadly, biology is the science that deals with living bodies. General biology, as understood in the *examinational sense*, considers certain typical living bodies in their structure and life-history." We should have no quarrel, however, with the basis, were the superstructure sound.

In the body of the book eighteen flowering plants are described with considerable detail, the object, apparently, being to introduce as many terms, with their definitions, as possible. Then follow chapters on the vegetable cell, cell contents, tissues and systems, the root, stem, leaf, inflorescence, floral organs and fruits. A glossary—are we never to get rid of this as the animus of elementary botanical text? Not content to have the book mainly such, the author urges "upon the student and teacher the importance, the necessity, of everyone constructing his own glossary. The earnest student will, as he meets with each new word, then and there enter it in his vocabulary. At the end of this volume will be found a glossary put together by me, and this the student can compare with his." Here is a sample of it:

WORD.	DERIVATION.	DEFINITION.	EXAMPLE.
Thorn.	A modified organ, hard and sharp.	Sloe.
Tissue.	A constituent of an organ.	Parenchyma or muscle.
Tripinnate.	tres, three; pinna, a leaflet.	Divided into three leaflets.	Leaf of hemlock.

It is to be hoped that the student will succeed better than the author, for of the three definitions, selected at random within a space of seven lines, not one is accurate. And why should not the derivation of "thorn" and "tissue" be sought out, as well as that of words with Greek and Latin roots? But what is the use of any of it? Would a student of English literature be urged to construct for himself an English lexicon?

Dr. Aveling makes much of derivations however. Witness the following: "The upper [leaves] have no stalk or petiole, and are therefore said to be sessile. *Sedeo, sedi, sessum, sedere*, I sit." Why omit the rest of the conjugation? "The particular kind of inflorescence is therefore a *corymb*. *κορυμβος*, (*korumbos*) a cluster of fruit, especially of ivy-berries (Vergil, 'Bucolics,' Ecl. iii. 39)." To which the skeptical are respectfully referred. And this (verbatim) is particularly good: "the Orpine is of the order Crassulaceæ, thus named from the thickness of its leaves. *crassus*, thick. Species, *Sedum*; genus, *Telephium*. *Sedum*,

from the sessile nature of the genus; *Telephium*, in the old over-classical fashion, from Telephus, the son of Hercules."

The author is evidently enamored of tabular arrangement, for he introduces tables, big and little, fragmentary and complete, at every available point.¹ Here is one at random, from which their value may be judged: "The fruit of the hazel can be worked out by reference to the fragment of the complete table given on p. 137." Then the entire page 137 is devoted to this, by means of which the fruit of the hazel ought to be "worked out" without severe mental strain:

FRUITS	{ monogynœcial.	{ simple.	{ syncarpous.	{ each carpel with one seed.	{ superior.			
			{ apocarpous..					
	{ polygynœcial.	{ compound.	{ each carpel with more than one seed.					
			{ inferior.					
				{ superior.		{ 1-celled, with cupule—GLANS.		
				{ inferior.		{ 2-celled.		

Page after page is covered with these "fragments," which are gathered up, warmed over and spread out again in later "tables."

As specimens of the information imparted by this "introduction" read the following:

"The common name for the gynœcium [of the Buttercup] is the pistil."

"Consider now only one carpel. It is clearly monogynœcial."

"Raceme . . . *Racemus*, a bunch of grapes, one of the best examples of this kind of inflorescence."

" . . . glaucous. This last word is used for a surface of excessive, shiny smoothness."

"The rootstock of the Cyclamen is a tuber. The most familiar example of a tuber is a potato. The tuber of the Cyclamen is a rootstock structure; that of a potato is formed from a branch . . . and is therefore a stem structure."

Here is a bit of technique: "And even in their case [leaves of Sedum and Hyacinth] it is wise to cut up the leaf into fragments, throw the pieces into melted paraffin, and when this has cooled and solidified, make thin sections through this and the embedded leaves." The naiveté of these directions will be very impressive to those who know the paraffin process.

After five pages on these subjects, good, bad and indifferent, the author avers that "The cell-wall, protoplasm, nucleus, starch grains, aleurone grains are now understood." That and the following which comes from near the close of the book must prove very cheering to the weary student: "If the student will now turn to the syllabus of the

¹ No less than 10 per cent. of the pages are occupied with such tabular views. Another 10 per cent. the glossary takes.

Science and Art Department printed in our first chapter, he will see that we have cleared off [but not up] not only the whole of the general morphology, histology and physiology, but also . . .”

Here is the beginning of the discussion of vessels: “A vessel in botany [sic] is formed out of a number of cells placed vertically one above the other, whose partition walls vanish. The simplest kind of vessels are *vasa propria* (vessels proper)—elongated cells with a thickening of the wall that takes the form of a very fine network. The student will note once again how artificial our definitions are, and how the botanical categories overlap each other. A vessel is defined as a tube formed by the fusion of several cells, and the first kind of vessel described, *vas proprium*, is made up of one cell. The second form of vessel is the sieve tube. . . . sieve tubes are also called vesicular or utricular vessels. They are common in the bulb of the onion . . . and other Monocotyledons. The sieve tubes contain a milky juice and very often crystals.”

The physiology is no better: “. . . the roots take in the nitrogen-containing food-stuffs and the leaves especially take in the carbon-containing food-stuff. From the roots the former must move up until they meet the latter coming down from the green parts. When the two sets of food-stuffs meet, the manufacture of those important plant structures that contain carbon, hydrogen, oxygen, nitrogen, must occur, and from the place where this manufacture occurs, diffusion of these substances to other parts of the plant must follow. . . . This taking in of food is assimilation.”

But to continue would be to occupy space to no good purpose. What we have given is not a selection of isolated blunders. It might be increased ten-fold without exhausting the supply of error and absurdity. Some of the illustrations, could we reproduce them, would be as ludicrous as the text.

We should be glad to be able to say something favorable about this book, if, even after careful search, we could find it. But the plan is crude and the execution wretched. Yet if we do not mistake the tone of the book the author feels that he has done a creditable piece of work, and the publisher hopes to gain for it a sale in this country. It is a pity that so reputable a house should be so imposed upon by a worse than worthless text-book.